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Who's Who V: The Interagency Energy/Environment R and D Program Directory and Index

Automation Industries, Inc.
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"Who's Who" is Part of EPA's Energy/Environment R & D decision series. Its Directory Format is designed to facilitate identification of projects, policy-makers, researchers, research managers, and others involved in the Federal Interagency Energy/Environment R & D Program.

"Who's Who" also includes some of the many individuals and organization outside of the interagency program who are involved in related work.

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Decision Series

Who's Who V

the

Interagency Energy/Environment R&D Program Directory & Index

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The Energy/ Environment R&D Decision Series

Some of the basic problems facing our society today involve the use of our energy resources and the consequent effects on our environment. These problems affect everyone, and everyone has an interest in their resolution. But the technical aspects of these problems make it difficult for a major portion of the interested public to understand and participate in the decision-making process. This volume contributes to the bridging of this information gap.

The Energy/Environment R&D Decision Series was inaugurated late in 1976. The series presents, in an easily understood and informative manner, selected key issues and findings of the Federal Interagency Energy/Environment Research and Development Program, which was initiated in fiscal year 1975. Planned and coordinated by the Environmental Protection Agency (EPA), the Interagency Program sponsors more than 1,000 research projects ranging from the analysis of health and environmental effects of energy systems to the development of pollution control technologies.

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Who's Who V
the
Interagency Energy/Environment R&D Program Directory & Index

United States Environmental Protection Agency
Office of Research and Development
Office of Environmental Engineering and Technology

January, 1980

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Foreword

The Interagency Energy/Environment Research and Development Program was created to provide a means of communication among the Federal research community, policy-level decisionmakers and the interested public. This type of a communication network has proven to be a most effective way to coordinate the Federal research effort and assure that appropriate energy/environmental research is being conducted without duplication of effort and funding.

Traditionally, Interagency Program research results have been communicated via project-specific reports, seminars and conferences. The *Who's Who* document consolidates, in directory format, representative research being performed by participating agencies, as well as by individuals and organizations outside the program who are involved in related work.

We hope that this edition of *Who's Who* will not only provide the most up-to-date energy/environment research information, but also encourage those personal communications which have, over the years, made the Interagency Program so successful.

Introduction

In the early 1970's, energy independence and environmental integrity emerged as charters for future energy/resource development.

Now as we are striving to reduce the Nation's dependence upon scarce, clean fuels — most notably, foreign petroleum — the development of domestic energy resources poses a variety of threats to environmental quality. The increased use of coal, for example, engenders environmental issues and problems affecting land, water, air, and human health. Effective control of potential environmental impacts due to changes in domestic energy systems must be based on a sound understanding of the course of future energy development. The Interagency Energy/Environment R&D Program is designed to provide the technical information necessary to ensure that sound decisions will be made.

More than a dozen Federal agencies and departments participate in the Interagency Program. In pursuing their mandate, programs and responsibilities, each agency must have awareness and access to ongoing research on the environmental effects of energy development while performing the research necessary to provide needed additional data. EPA coordination of the Interagency Program minimizes the overlap of research programs to assure comprehensive coverage of all energy/environment questions.

In addition, the results of the multiagency research program are disseminated and reviewed through a system of publications, joint conferences and symposia coordinated by EPA's Office of Environmental Engineering and Technology. *Who's Who* is a representative publication of this system. *Who's Who V* is by no means all-inclusive; it is designed to identify representative current research projects, policymakers, researchers, research managers, and others involved in the Interagency Program. It also includes some of the many individuals and organizations outside the Program who are involved in related work.

Introduction

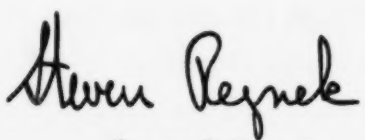
Who's Who V is designed to be used in conjunction with three companion documents, each of which explores different facets of the Interagency Energy/Environment R&D Program.

The Interagency Energy/Environment R&D Program Status Report. The Status Report covers, in executive summary format, the entire scope of the Interagency Program. Included are descriptions of the program today, its history, and its future goals and directives.

Fiscal Year 1977 Research Program Abstracts of the Interagency Energy/Environment Program. This report contains the project descriptions of the $96 million in FY 1977 R&D projects funded and coordinated by the Interagency Program. Project descriptions not only represent past and present research and development, but also illustrate the full range of the Program's energy-related research.

Bibliography of the Interagency Energy/Environment R&D Program. This document contains publications covering current R&D as well as technical publications dating back to 1976.

All four documents are intended to serve the Interagency Program's goal of formulating a technical information system that provides access and communication among researchers, decisionmakers and the interested public.



Steven R. Reznek
Deputy Assistant Administrator
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and Technology

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How to Use Who's Who V

Program Description. This directory provides a means of access to information on specific project areas currently underway within the Federal Interagency Energy/Environment Research and Development Program. The Program, designed to determine the environmental implications and effects of the Nation's energy development efforts, is divided into two broad segments:

The Health and Environmental Effects Program consists of the research activities associated with the behavior and effects of energy-related pollutants once they are in the environment. Four subprograms are involved:

Measurement Systems and Instrumentation
Transport and Fate
Health Effects
Ecological Effects

The Control Technology Program is designed to provide information on the types and quantities of pollutants released by energy supply activities and to develop or stimulate the development of control options where necessary. This program consists of six subprograms:

Fuel Extraction
Fuel Processing, Preparation, and Advanced Combustion
Environmental Impacts of Conventional and Advanced Energy Systems
Flue Gas Sulfur Oxide Control
Nitrogen Oxide Control
Flue Gas Particulate Control

Project Areas are listed by descriptive title under each category. Listings include selected research projects from the total Interagency Program.

The Project Contact is responsible for implementing the project and/or having cognizance of its technical scope and status. The name of the project contact, as well as his affiliation, appears bracketed, in bold-face type, after each project title. Where applicable, grantee or contractor project funding is indicated as follows:

[John Doe - (Project Contact) **UCLA,** (Affiliation) **via USDA/SEA/CR]** (Funding Source)

How to Use Who's Who V

The Agency Coordinator is the policy-level individual within the performing agency who has overall supervisory responsibility for the projects. The following listing contains the names of the agency coordinators, the agency they represent, and the federal agency abbreviations used throughout this directory.

DR. STEVEN R. REZNEK	Environmental Protection Agency (EPA)
DR. RUTH CLUSEN	Department of Energy (DOE)
DR. GREGORY T. O'CONOR	Department of Health, Education, and Welfare (HEW)
DR. DAVID P. RALL	National Institute of Environmental Health Sciences (NIEHS)
DR. KENNETH BRIDBORD	National Institute of Occupational Safety & Health (NIOSH)
DR. DONNA SHALALA	Department of Housing and Urban Development (HUD)
DR. LAWRENCE R. GREENWOOD	National Aeronautics and Space Administration (NASA)
DR. H. G. MOORE	Tennessee Valley Authority (TVA)
HARRY BROWN	US Department of Agriculture (USDA)
C. W. CARLSON	Agricultural Research Service (SEA/AR)
DR. EILIF V. MILLER	Science and Education Administration, Cooperative Research (SEA/CR)
	Regional Coordinators for University Projects:
	Northeast - D. W. ZINN North Central - S. ALDRICH South - C. O. LITTLE West - J. ASLESON
DR. KENNETH R. FARRELL	Economics, Statistics And Cooperative Service (ESCS)
D. THORUD	Forest Service (FS)
ROBERT MacLAUCHLAN	Soil Conservation Service (SCS)
JERRY JASINOWSKI	US Department of Commerce (USDC)
R. KAMMER	National Bureau of Standards (NBS)
J. P. WALSH	National Oceanic & Atmospheric Administration (NOAA)
DR. SIDNEY GALLER	Office of Environmental Affairs (OEA)
BRUCE BLANCHARD	US Department of the Interior (USDI)
DR. LINDSAY NORMAN, JR.	Bureau of Mines (BOM)
HERBERT B. QUINN, JR. (Acting)	Fish and Wildlife Service (FWS)
GEORGE H. DAVIS	United States Geological Survey (USGS)

An alphabetical, cross-referenced listing of all the project contacts, EPA program managers, agency coordinators, and other information sources follows the listing of projects and additional sources. Included are mailing addresses and commercial and, where applicable, FTS telephone numbers.

Health and Environmental Effects Program

The health and environmental effects program within the Federal Interagency Energy/Environment Research and Development Program is designed to identify the mechanisms of pollutant movement within the environment and the resulting effects on human, animal, and plant populations which are associated with energy-related activities. The goal of the program is to compile and evaluate information to support decisions relative to the protection of natural biota, human health, welfare, and social goals.

The EPA Program Manager is the individual in EPA's Office of Environmental Processes and Effects Research responsible for coordinating project activities in these areas. The following is a listing of the EPA program managers for the health and environmental effects subprograms:

• Director, Energy Effects Division, OEPER	W. FRIETSCH, III
• Measurement Systems and Instrumentation	J. STEMMLE
• Transport and Fate	D. GOLOMB
• Health Effects	C. NAUMAN
• Ecological Effects	A. GALLI, D. WEBER

Measurement Systems and Instrumentation

This program is directed toward identifying and quantifying ambient pollutants associated with expanding energy development and toward development of associated pollutant measurement capabilities. The major objectives of the program are to establish a baseline of environmental data so that the multimedia impact on environmental quality from anticipated energy development can be quantitatively established. Also involved is the development of validated sampling and analytical methods and procedures to ensure a measurement capability for pollutants from emerging energy technologies.

- Western energy/environment monitoring study
  - Western regional air and water monitoring and data analysis [**D. McNelis - EPA**]
  - Northern Great Plains energy/air quality baseline information [**T. Thoem - EPA**]
  - Western air monitoring quality assurance support [**S. Bromberg - EPA**]
  - Atmospheric and meteorological studies of pollutants from energy production in the western United States [**R. Pueschel - NOAA**]
  - Meteorological interpretation and prediction of air quality related to energy activities in the western United States [**L. Machta - NOAA**]
  - Western water monitoring quality assurance support [**D. Ballinger - EPA**]
  - Western groundwater monitoring and techniques development [**L. McMillion - EPA**]
  - Western overhead surface monitoring and techniques development [**R. Landers - EPA**]
  - Energy-related surface and groundwater monitoring studies/western region [**H. Hudson - USGS**]
  - Technical support for western energy-related environmental assessment/overhead monitoring method development [**H. Melfi - NASA**]
- Eastern energy-related environmental assessment [**H. Melfi - NASA**]
- Energy-related radiological monitoring and techniques development [**E. Bretthauer - EPA**]
- Energy-related radiological monitoring quality assurance [**A. Jarvis - EPA**]
- Energy-related air pollutant measurements and instrumentation development [**A. O'Keeffe - EPA**]

- Development of energy-related air measurements, instrumentation, and analytical methods [G. Goldstein - DOE]
- Energy-related air and water pollutant analysis method development [C. Gravatt - NBS]
- Energy-related air and water pollutant standard reference materials [C. Gravatt - NBS]
- Radiological pollutant standard reference materials [C. Gravatt - NBS]
- Development of instrumentation and devices for the measurement of hazardous agents in the occupational environment associated with energy use [W. Wagner - NIOSH]
- Development and evaluation of an integrated approach to the optimization of nuclear power plant radiological surveillance programs [E. A. Belvin - TVA]
- Remote sensing of SO_2 effects on vegetation [H. C. Jones III - TVA]
- Design of a service assessment sampling system [A. B. Craig, J. Dorsey - EPA]
- Development of particulate measurement technique for process evaluation [A. B. Craig, J. Dorsey - EPA]
- Inorganic sampling and analysis of process streams [A. B. Craig, J. Dorsey - EPA]
- Development of process measurements for POM and other organic compounds [A. B. Craig, J. Dorsey - EPA]
- Development of high pressure, high temperature sampling [A. B. Craig, J. Dorsey - EPA]
- Development of fugitive emission measurement techniques [A. B. Craig, J. Dorsey - EPA]
- LIDAR techniques for measuring particulate pollutants from energy production and transport and dispersion processes [V. Derr - NOAA]
- Remote monitoring for energy-related pollutants and effects techniques development [D. McNelis - EPA]
- Energy-related water pollutant monitoring techniques development [D. Ballinger - EPA]

Measurement Systems and Instrumentation

- Energy-related low-level trace contaminant identification, measurement and analysis of solid waste and effluent water [**W. Donaldson - EPA**]
- Water monitoring field instrumentation development [**P. Greeson - USGS**]
- Energy-related surface and groundwater studies/eastern region [**F. Kilpatrick - USGS**]
- Development of aqueous effluent analytical methods for energy-related sources [**G. Goldstein - DOE**]
- Energy-related remote sensing instrumentation development [**J. P. Mugler, Jr. - NASA**]
- Isolation and identification of waterborne pollutants associated with the power industry (steam electric power generation) [**C. W. Holley - TVA**]
- Marine measurement quality assurance [**M. A. Basileo - NOAA**]
- Ocean oil spill concentration and trajectory forecast [**C. S. Barrientos - NOAA**]

Transport and Fate

The transport processes area traces the transmission by air, water, and soil of pollutants emitted from energy operations from their sources to their destination in man and the environment. Additionally, it covers the physical and chemical changes that the pollutants undergo during their transport. Emphasis in air transport research is on conversion (mainly by coal-burning power plants) of sulfur and nitrogen oxides. Formation and transport of photochemical oxidants from various energy sources is also emphasized.

- Fate of specific pollutants in freshwater [**W. M. Sanders, III - EPA**]
- Transport and fate of energy-related pollutants in groundwater [**W. Galegar - EPA**]
- Determination of transformation pathways, physical and chemical perturbation, and toxicity of crude oil to freshwater organisms in Arctic lakes [**B. Reid - EPA**]
- Determination of mechanisms of transformation, degradation, fate, and effect of crude oil in stream ecosystems [**B. Reid - EPA**]
- Determination of transport pathways, transfer rates, and fate of pollutants and degradation products of crude oil in soil and active layer of permafrost terrain [**B. Reid - EPA**]
- Extension of multi-layer, two-dimensional (horizontal) model of circulation to accept a heated discharge as a pollutant [**R. Callaway - EPA**]
- Subacute effects of petroleum processing discharges on marine organisms of the West Coast [**D. J. Baumgartner - EPA**]
- Identification of by-products from biocides used in coastal marine power plants, and effects upon marine organisms/communities, and quality of coastal ecosystems [**W. P. Davis - EPA**]
- Development of community assessment testing, procedures for biocides/natural process interactions and effects [**W. P. Davis - EPA**]
- Chemical, physical, and meteorological studies of energy-related pollutants in the atmosphere [**P. Altshuller - EPA**]
- Evaluation of models for predicting radiological impact of gaseous releases from nuclear power plants [**E. A. Belvin - TVA**]
- Determination of atmospheric transport and transformation of emissions from coal-fired power plants [**H. C. Jones III - TVA**]

- Development of simulation models of thermal dispersion and fluid mechanics at critical locations in streams and reservoirs [**R. J. Ruane - TVA**]
- Strip mine drainage water quality with emphasis on toxic substances [**R. P. Betson - TVA**]
- Radionuclide waste management monitoring [**A. Wallace, C. Strojan - U. of CA via DOE**]
- Determination of the transport and fate of fuel wastes through soil and solid waste sites [**R. L. Watters - DOE**]
- Oil spill persistence in tundra and impacts in subsurface Arctic ecosystems [**R. L. Watters - DOE**]
- Determination of organic pollutant load and dynamics of resulting refinery wastes into marine waters [**H. McCammon - DOE**]
- Determination of the load and dynamics of oil refinery wastes in Lake Michigan [**H. McCammon - DOE**]
- Transport, transformation, fate, and effects of toxic metals and petroleum hydrocarbons in selected marine ecosystems [**D. A. Wolfe - NOAA**]

Health Effects

The health effects research program is devoted to determining the long-term adverse health impacts that can ensue as a consequence of implementing a particular energy policy. Of major concern are those health effects which may result as a consequence of long-term, low-level exposures and that manifest themselves only after a long period of time—carcinogenicity, teratogenicity, mutagenicity and system dysfunction such as cardiopulmonary system disorders. The necessary data are obtained through a coordinated program of clinical, epidemiological, and toxicological studies, and through the development and use of more rapid and sensitive bioscreening techniques.

- Water exposures and effects: heavy metals and toxic organic chemicals **[W. Grube - EPA]**
- Epidemiological studies of human exposure to pollutants emitted in ambient air as a result of coal conversion and utilization **[C. Hayes - EPA]**
- Assessment of human exposure-effects relationships **[R. Stacy - EPA]**
- Development and application of *in-vitro* bioassays for mutagenesis, presumptive carcinogenesis, and related toxic effects resulting from exposure to pollutants associated with energy development **[M. Waters, R. Bull - EPA]**
- Studies of carcinogenesis of pollutants from energy sources **[D. L. Coffin - EPA]**
- Neurobiology and behavioral toxicology **[L. Reiter - EPA]**
- Inhalation toxicology studies of energy-related pollutants **[D. Gardner - EPA]**
- Epidemiological studies of human exposure to pollutants as a result of coal mining **[D. Greathouse - EPA]**
- Identification of the most potent carcinogens, mutagens, teratogens, and physiologically detrimental agents in process streams, products and by-products, and effluents from major fossil fuel extraction and conversion technologies **[G. Stapleton - DOE]**
- Development of cytological and biochemical indicators to estimate toxicity from oil and coal extraction, conversion, and utilization **[D. Smith - DOE]**
- Determination of effects and organ distribution of hazardous trace metals and polycyclic hydrocarbons associated with coal and oil shale extraction, conversion, and utilization **[D. Craig - DOE]**
- Assessment of the hazards of trace and heavy metals and organic agents of non-nuclear energy technologies using chromosome aberration, isozyme patterns, and teratogenic effects on mammalian embryos as indicators **[G. Duda - DOE]**
- Pharmacologic effects **[L. Hart - NIEHS]**

- Identification of damage to cells and cell components resulting from pollutants from non-nuclear energy technologies [**L. Hart - NIEHS**]
- Assessment of the metabolism, fate, and toxicology of particulates and organic compounds associated with non-nuclear energy technologies [**L. Hart - NIEHS**]
- Dose-effect relationship for biological effects of toxic agents in non-nuclear energy technologies [**R. Dixon - NIEHS**]
- Mechanisms of incorporation, metabolism, deposition, and turnover of toxic agents associated with energy-related hazardous materials [**R. Dixon - NIEHS**]
- Teratogenic and reproductive effects [**R. Dixon - NIEHS**]
- Development and testing of models and concepts for extrapolation of cellular and animal data to man, using toxic agents from energy technologies [**D. Hoel - NIEHS**]
- Extrapolation and risk assessment [**D. Hoel - NIEHS**]
- Determination of dose effect relationships for mutagenic agents associated with non-nuclear energy technologies [**H. Malling - NIEHS**]
- Development of physiological indicators of damage from toxic agents [**H. Malling - NIEHS**]
- Subcellular, cellular, and organ toxicity [**C. F. Chignell - NIEHS**]
- Inhalation toxicity and pulmonary effects [**P. Nettesheim - NIEHS**]
- Behavioral and neurotoxic effects [**C. L. Mitchell - NIEHS**]
- Mutagenic effects [**F. J. de Serres - NIEHS**]
- Occupational health effects research associated with energy technologies [**A. Thomas - NIOSH**]

Ecological Effects

This program has the overall goal of assessing the environmental effects of present and proposed energy development activities on fresh surface and groundwater, marine and estuarine waters, and atmospheric/terrestrial ecosystems. The program includes research on (1) the nature and effects of energy-related pollutants resulting from extraction of raw fuels on the terrestrial ecosystem; (2) the determination of background contamination levels, in both the marine and estuarine environments, resulting from oil and gas drilling operations; and (3) the accumulation of baseline information needed to predict the impacts of heat on the freshwater ecosystems of lakes, rivers, and ponds.

- Development of models for comparison of pollutant impact on population dynamics of fishes **[E. Schneider - EPA]**
- Determination of toxicological effects of pollutants from petroleum extraction and fossil-fueled refineries and power plants on marine and estuarine organisms and ecosystems **[D. Baumgartner - EPA]**
- Determination of thermal and thermal-metal synergistic effects on marine organisms **[E. Schneider - EPA]**
- Determination of dose-response relations of pollutants on selected western arid and grassland species from coal and oil shale processes **[E. Preston - EPA]**
- Determination of the nature, loading, distribution, and long-term effects of crude oil in the Gulf of Alaska marine and estuarine ecosystem **[B. Reid - EPA]**
- Determination of toxicity to marine organisms of petrochemicals and energy-related organic solvents from offshore activities and ocean dumping **[T. Duke - EPA]**
- Effects of aqueous effluents from *in situ* fossil fuel processing technologies on aquatic systems **[L. H. Mueller - EPA, D. Farrier - DOE]**
- Chemical and biological characterization of oil shale processing and coal conversion effluents **[L. H. Mueller - EPA]**
- Evaluation of the environmental impact of energy-related organic compounds on aquatic organisms **[J. I. Teasley - EPA]**
- Dispersal of coal dust from trans-shipment and power plant storage facilities **[K. E. Biesinger - EPA]**
- Assessment of energy-related toxicant stress to aquatic ecosystems in channels **[T. Roush - EPA]**
- Evaluation of human and environmental exposure to air and water pollutants from coal-fired steam plants **[G. E. Glass - EPA]**

Ecological Effects

- Determination of the overall environmental effects of atmospheric fallout on aquatic ecosystems **[G. E. Glass - EPA]**
- Critical review and evaluation of research on the impact of energy-related wastes on the aquatic environment **[K. E. Biesinger - EPA]**
- National coordination of ecological damage assessment programs for spills of oil and hazardous materials in marine and fresh waters **[P. Lefcourt - EPA]**
- Biological monitoring of mollusks as sentinel organisms for pollutants in coastal waters of the U.S. **[E. Schneider, F. G. Lowman - EPA]**
- Coastal ecosystems characterization **[D. Woodard - USDI]**
- Assessment of water quality in strip-mined areas as it relates to habitat for aquatic organisms and wildlife species associated with these water bodies **[D. Thorud - USDA]**
- Assessment of the redeposition and stabilization of mine spoils and identification of technologies that will enhance water quality for associated aquatic life **[D. Thorud - USDA]**
- Assessment of effects of mining-related transportation systems in water, air, soil, plant, animal, and aesthetic resources **[D. Thorud - USDA]**
- Development of operational technical information system for reclamation of lands affected by mining **[D. Thorud - USDA]**
- Development of pre-operational mining reclamation plans **[R. Follett - USDA/AR]**
- Determination of effect of strip-mining and reclamation processes on effluent water quality and quantity **[R. Follett - USDA/AR]**
- Determination of effect of strip-mine reclamation practices on the nutritional quality of forages or other crops grown on reclaimed area **[R. Follett - USDA/AR]**
- Evaluation of species and seed sources for revegetation of energy resource extraction areas with native plants **[R. Follett - USDA/AR]**
- Determination of soil characteristics developing on spoils of varying ages relating to root growth and biological productivity **[R. Follett - USDA/AR]**

- Environmental effects of energy development [E. V. Miller - USDA/SEA/CR]
  - Water relations and root development [R. Smith - U. of WV via USDA/SEA/CR]
  - Hydrologic management in strip-mining [D. Kirkham - IA St. U. via USDA/SEA/CR]
  - Crops productivity [R. Hanson - U. of MO via USDA/SEA/CR]
  - Resource inventory systems [W. Nelson - ND St. U. via USDA/SEA/CR]
  - Drainage requirements [C. E. Anderson - IA St. U. via USDA/SEA/CR]
  - Remote-sensing applications [C. Johannsen - U. of MO via USDA/SEA/CR]
  - Ground truth for remote-sensing [C. Johannsen - U. of MO via USDA/SEA/CR]
  - Acid-forming minerals [L. Hossner - TX A&M via USDA/SEA/CR]
  - Model of hydrology [B. Barfield - U. of KY via USDA/SEA/CR]
  - Forest site preparation [R. Hay - U. of TN via USDA/SEA/CR]
  - Hydrologic effects [V. Shanholtz - VPI via USDA/SEA/CR]
  - Soil genesis and biota [D. Dollhopf - MT St. U. via USDA/SEA/CR]
  - Germination and seed development [L. Wiesner, G. Brown - MT St. U. via USDA/SEA/CR]
  - Tree-mycorrhizal associations [C. Reid - CO St. U. via USDA/SEA/CR]
  - Precipitation management [W. Hall - CO St. U. via USDA/SEA/CR]
  - Vegetation-environment [C. Bonham - CO St. U. via USDA/SEA/CR]
  - Salt translocation [R. Hodder - MT St. U. via USDA/SEA/CR]
  - Mine spoil microbiology [W. Lindemann - NM St. U. via USDA/SEA/CR]
  - Impacts of development [J. Jacobs - U. of WY via USDA/SEA/CR]
  - Minesoils, Powder River basin [G. Nielsen - MT St. U. via USDA/SEA/CR]

- Summarization of results of research on the physiological, toxicological, and ecological effects of oil, primarily on ducks **[L. Stickel - USFWS]**
- Description of guidelines and methodology for the development, synthesis, analysis, and interpretation of complex information relative to major coastal ecosystems **[H. Tait - USFWS]**
- Preparation of reports on three coastal regions subject to energy development; emphasis on value of resources subject to human-induced environmental alternatives **[H. Tait - USFWS]**
- Identification and demonstration of rapid and reliable method of inventorying and characterizing wildlife habitat; emphasis on requirements for food, cover, breeding **[R. Stewart, Jr. - USFWS]**
- Development of methods for estimating impacts of power plants on fish and shellfish **[E. S. Fritz - USFWS]**
- Development of in-stream flow methodologies to determine flow requirements for biological/fisheries stability in areas affected by increased energy development—both east and west **[H. Doerksen - USFWS]**
- Development of mechanisms to identify and monitor the activities of endangered species in areas under stress from energy development **[H. Doerksen - USFWS]**
- Determination of water quantity requirements of fish and wildlife in the upper Colorado and upper Missouri River basins **[H. Doerksen - USFWS]**
- Compensation in fish populations **[C. P. Goodyear - USFWS]**
- Effects of entrainment in cooling systems on fish eggs and larvae **[D. Hamilton, Jr. - DOE]**
- Ecological effects of cooling systems **[D. Hamilton, Jr. - DOE]**
- Impact of condenser passage on plankton **[D. Hamilton, Jr. - DOE]**
- Effects of oil spills on tundra and thaw ponds **[R. L. Watters - DOE]**
- Effects of construction and operations of Alaska pipeline on aquatic habitats **[R. L. Watters - DOE]**
- Long-term effects of hydrocarbons on selected ecosystems and associated organisms **[H. McCammon - DOE]**
- Surveys on oil extraction and transport and related effects on coastal ecosystems **[H. McCammon - DOE]**

- Effects of trace metals on crop and forest ecosystems [**R. A. Lewis - DOE**]
- Intake of metals by marine organisms [**L. G. Hart - NIEHS**]
- Comparison of pharmacokinetics and toxicity in mammals of metals consumed in diet through shellfish vs drinking of water [**L. G. Hart - NIEHS**]
- Synergistic action of temperature with other pollutants on marine species [**L. G. Hart - NIEHS**]
- Relationship between toxic fractions of crude oil and petroleum products and tumor formation in marine species [**L. G. Hart - NIEHS**]
- Relationships of atmospheric pollutants (SO_x + NO_x) from coal-fired power plants on terrestrial ecosystems [**H. C. Jones III - TVA**]
- Thermal effects from mechanical draft cooling towers on vegetation and soil [**H. C. Jones III - TVA**]
- Development of baseline information and identification, characterization and quantification of transfer and fate and effects of coal-fired power plant emissions in terrestrial ecosystems [**H. C. Jones III TVA**]
- Response of freshwater systems to electric power production [**B. G. Isom - TVA**]
- Production of anthropod pests and vectors in strip-mine pools [**B. G. Isom - TVA**]
- Ecological recovery after reclamation of toxic spoils left by coal surface mining [**T. G. Zarger - TVA**]
- Environmental assessment of northern Puget Sound and Strait of Juan De Fuca [**H. S. Harris - NOAA**]
- Comparison/analysis of an existing marine ecosystem under stress of an active oil field with a similar ecosystem in an undisturbed area [**E. F. Klima - NOAA**]
- Design, establishment, operation, and evaluation of a data management system for interagency energy-related marine and meteorological programs [**K. Hughes - NOAA**]

Control Technology Program

The Control Technology Program is designed to provide information on the types and quantities of pollutants released by energy supply activities and to develop or stimulate the development of control options where necessary. This technology research program is further divided to group research on the activities associated with fuel extraction and processing separately from that research on energy conservation and utilization. The following is a listing of the EPA program managers who oversee the control technology programs:

• Director, Control Technology Program	F. PRINCIOTTA
• Fuel Extraction	W. BLOCH
• Fuel Processing, Preparation & Advanced Combustion	M. ALTSCHULER
— Fluidized Bed Combustion	M. ALTSCHULER
— Coal Cleaning	W. McCARTHY
— Synthetic Fuels	K. JAKOBSON (Oil Shale) M. ALTSCHULER (Coal)
• Environmental Impact of Conventional and Advanced Energy Systems	D. BERG
— Integrated Technology Assessment	L. SMITH P. SCHWENGELS
— Waste Heat/Waste Products	K. JAKOBSON
— Conventional Combustion Environmental Assessment	D. BERG
— Advanced Energy Systems and Conservation	B. HEILER
• Flue Gas Sulfur Oxide Control	R. STATNICK
• Nitrogen Oxide Control	R. STATNICK
• Flue Gas Particulate Control	G. REY

Fuel Extraction

The fuel extraction program deals with environmental quality problems associated with the technologies and processes for obtaining fuels, oil or natural gas extraction, oil shale development, and coal mining. The major purposes of the research program are (1) to assess the existing and potential adverse environmental impacts from active and planned oil and gas production, storage, and transportation; (2) to develop methods, technology, and equipment to prevent, control, and abate environmental pollutants from these operations including spill clean-up; and (3) to document the technical/operational feasibility and cost effectiveness of environmental control options.

- Oil and Gas Production **[I. Wilder, J. S. Farlow - EPA]**
  - Control and clean up oil spills, including limiting extent of contamination and mitigating adverse environmental effects
  - Protect and restore shorelines contaminated by oil
  - Evaluation of effectiveness of 1973 oil spill prevention regulation (40 CFR, Part 112) in reducing the number of spill incidents
  - Minimizing adverse environmental impacts from the installation and operation of oil and gas production facilities (onshore and offshore)
  - Cost-effective methods for treating bilge and ballast water at shore reception facilities
- Solid fossil fuels **[R. Hill, E. Harris - EPA]**
  - Control of environmental damages from active and abandoned western U.S. coal surface and underground mines and associated surface disturbances
  - Control of environmental damages from oil shale and tar sands extraction disposal of spent waste from beneficiation
  - Control of environmental damages (except radiation) from active and abandoned uranium extraction and beneficiation operations
  - -- Control of environmental damages from the transportation of solid fuels
- Reduction of adverse environmental effects from uranium mill wastes **[R. Kennedy - DOE]**
- Eastern coal surface mining: vegetative methods and materials **[D. Thorud - USDA]**
- Western coal and oil shale mining: vegetative methods and materials **[R. MacLauchlan - USDA/SCS]**

- Surface manipulations for enhanced coal and oil shale mine vegetation [**R. F. Follett - USDA/SEA/AR**]
- Mineland reclamation
  - Mineland reclamation [**D. McCormack - USDA**]
  - Abandoned mineland reclamation [**H. B. Montgomery - USDI, D. J. O'Bryan, Jr. - USDI**]
  - Reclamation use of containerized seedlings [**R. Hutnik - PA St. U. via USDA/SEA/CR**]
  - Classifying minesoils [**R. M. Smith - U. of WV via USDA/SEA/CR**]
  - Waste application in revegetation [**R. Keefer - U. of WV via USDA/SEA/CR**]
  - Weathering of overburdens [**C. Roth - Purdue via USDA/SEA/CR**]
  - Use of sewage sludge and topsoil [**F. Haghiri - St. of OH via USDA/SEA/CR**]
  - Reclamation of surface-mined land [**C. Barnhisel - U. of KY, I. Jansen - U. of IL via USDA/SEA/CR**]
  - Overburden criteria for plant growth [**W. Byrnes - Purdue via USDA/SEA/CR**]
  - Geologic criteria in revegetation [**C. Barnhisel - U. of KY via USDA/SEA/CR**]
  - Rehabilitation of oil shale and coal lands [**C. McKell - UT St. U. via USDA/SEA/CR**]
  - Belowground biology [**D. Coleman - CO St. U. via USDA/SEA/CR**]
  - Legumes in revegetation [**W. Campbell - UT St. U. via USDA/SEA/CR**]
  - Forage production model [**T. Sammis - NM St. U. via USDA/SEA/CR**]
  - Amendments for sodic and coaly spoils [**W. Gould - NM St. U. via USDA/SEA/CR**]
  - Coal surface mining reclamation and mining [**D.Maneval - USDI**]
  - Reclamation of *in situ* oil shale projects or development sites [**M. Smith, Q. Skinner - U. of WY via DOE**]

This program participates in the development of advanced technologies for fossil fuel processing by providing environmental assessments, bench-scale research, technology assessments and guidance in process control technology. There is close cooperation with the Department of Energy process development and environmental programs to identify and quantify all residuals from fluidized bed combustors, synthetic fuels, oil shale development, and coal cleaning. Comprehensive environmental assessments are performed for these technologies to anticipate the severity of each environmental threat and corresponding means for control.

Fluidized Bed Combustion

The Interagency Program for direct combustion involves (1) environmental assessment of direct combustion technology, (2) development of environmental control technology for FBC, and (3) chemically-active fluidized bed (CAFB) oil gasification/clean-up combustion processes development.

- Multimedia pollutant assessment for conventional combustion systems **[E. Plyler, W. Ponder - EPA]**
- Environmental assessment of stationary combustion control technology **[R. Hall, J. Bowen - EPA]**
- Characterization of emissions from conventional combustion systems **[W. Ponder, W. Peters - EPA]**
- Environmental assessment of residual oil processing **[S. Rakes - EPA]**
- Environmental assessment of wastewater effluents **[M. C. Osborne - EPA]**
- Characterization of effluents from coal-fired utility boilers **[H. B. Flora II - TVA]**
- Fly ash characterization and disposal **[H. B. Flora II - TVA]**
- Environmental assessment and systems analysis of combustion modification for stationary sources **[R. Hangebrauck, J. Bowen - EPA]**

- Long-term performance and corrosion testing of combustion modifications for coal-fired utility boilers [**D. Lachapelle - EPA**]
- Development of combustion controls for stationary reciprocating internal combustion engines and gas turbines [**J. Wasser, W. S. Lanier - EPA**]
- Development and application of improved burner designs and advanced processes for NO_x emissions control [**G. B. Martin - EPA**]
- Development of combustion modification technology for industrial and commercial boilers and residential systems [**G. B. Martin, R. Hall - EPA**]
- Environmental assessment and control technology study of industrial process combustors and afterburners [**J. Wasser - EPA**]
- Fundamental combustion research for pollution control [**W. S. Lanier - EPA**]
- FBC environmental assessment [**D. B. Henschel - EPA**]
- Environmental assessment applications testing of combustion modification technology for stationary sources [**R. Hangebrauck - EPA**]
- Development of control technology for pollutants and processes with fluidized bed combustion [**D. B. Henschel - EPA**]
- Environmental assessment of fluidized bed combustion technology [**D. B. Henschel - EPA**]

The primary objective of the physical and chemical coal cleaning research and development program is to develop commercially available processes to remove the ash, inorganic sulfur, and as much of the organic sulfur as possible from coal, thus making an increased quantity of coal acceptable for use in areas where air quality regulations allow the combustion of medium (one or two percent) sulfur coals.

- Environmental assessment of coal cleaning technologies, storage and transportation [**J. Kilgroe, R. Hangebrauck, K. Janes - EPA**]
- Investigation, testing, evaluation, and development of coal cleaning technology and process controls [**D. Tamny - EPA**]
- Development of control technology for potentially harmful trace elements in coal cleaning wastes [**E. Wewerka - DOE, D. Kirchgessner - EPA**]
- Evaluation of the cleanability studies on U.S. coals [**J. Kilgroe - EPA**]
- Investigation of coal preparation, plant pollution, control techniques [**R. M. Cole, J. Kilgroe - EPA**]

The Interagency Program for synthetic fuels seeks to assure that commercial application of synthetic fuel production and utilization can be achieved within tolerable environmental limits. The program's approach involves three principal efforts: assessing environmental effects of synthetic fuels technology, establishing control objectives through standards-of-practice manuals and support of standard-setting, and developing control technology as necessary.

- Environmental assessment of potential pollutants from synthetic fuel processes (coal gasification and liquefaction) [**W. Rhodes - EPA**]
- Development of multimedia pollution control technology for synthetic fuel processes [**M. Gottleib - DOE**]
- Chemically active fluidized bed [**S. Rakes - EPA**]
- Identification of potential pollutants from developing oil shale processes [**W. McCarthy - EPA**]
- Development of wastewater control technology for oil shale processes [**W. McCarthy - EPA**]
- Development of air control technology for oil shale industry [**R. Thurnau - EPA**]
- Development of control technology monitoring methodology [**P. Fox - LBL, P. Mills - EPA, R. Magee - Radian**]
- Identification of potential pollutants and development of control technology for noncoal synthetic fuel processes [**T. Powers, R. Thurnau - EPA**]

Research in this program is designed to: assess environmental risks; conduct bench-scale system and/or control technology research; and identify environmentally, socially, and economically acceptable alternatives for modified conventional energy systems, advanced energy supply concepts, and energy conserving techniques. The program, which will assist EPA in selecting policies and in setting environmental standards, comprises comprehensive environmental assessments of energy systems. These integrated technology assessments quantify the cost/risk/benefit tradeoffs of energy systems and pollution control alternatives. A comprehensive assessment of unregulated and regulated residuals from conventional combustion sources is one major project of this program. Other environmental assessments included in this program will examine industrial energy conservation, wastes as fuel, solar energy, energy-related solid and waterborne residuals, geothermal energy, waste heat recovery, and advanced energy cycles.

Integrated Technology Assessment

The overall objective of the integrated technology assessment (ITA) program is to identify environmentally, socially, and economically acceptable alternatives for meeting national energy objectives and to assist in the selection of "optimum" policies for the attainment of associated environmental quality goals.

- Information support for Montana state officials, using appropriate federal, state, and local information sources **[A. Lefohn - EPA]**
- Federal non-nuclear energy, research, and development program (Section 11) **[G. Ondich - EPA]**
- Technology assessment of western energy resource development **[M. Devine - U. of OK via EPA]**
- Integrated technology assessment of energy development in the Appalachian region **[V. Jelen - EPA]**
- Electric utility simulation and industrial coal use studies **[A. Van Horn - TEKNEKRON via EPA]**
- Ohio River Basin Energy Study **[J. Stukel, B. Keenan - ORBES]**
  - Water supply and energy development effects on water quality, land use, public health
  - Coal industry and labor force structure and impacts of energy development

- — Projection of population size and demographic characteristics (1977-2000)
- — Government regulations and public participation in energy development
- — Demand for energy, capital availability
- — Regional economic analysis

- Integrated assessment of Texas lignite development **[D. White - TX Energy Adv. Coun. via EPA via DOE]**
- Regional scale transport and transformation of sulfur pollutants in the atmosphere **[L. Smith - EPA]**
- Environmental sulfur budget for the eastern U.S. **[R. Husar - WA U. via EPA]**
- Cost/benefit analysis of LWR fuel reprocessing **[R. Husar - WA U. via EPA]**
- New source performance standard development support activities **[L. Smith -EPA]**
- Methodology development for the technology assessment modeling project **[L. Smith - EPA]**
- Integrated assessment of petroleum transportation **[J. Stemmle - EPA]**
- Coal technology assessment **[G. Hereford - EPA]**
- Consequences of alternative public policies on inter-regional patterns of coal development **[J. Barse - USDA]**
- Economic impact of coal development in the Northern Great Plains **[L. Bender - USDA]**
- Development of a cost/risk/benefit methodology for western energy development **[A. Ford - DOE]**
- Development of energy/environment economic projection models for multi-county areas **[H. Hinote - TVA]**
- Application of computer graphics for regional integrated assessment of power systems **[H. R. Hickey - TVA]**

The overall objective of this activity is the identification, characterization, and assessment of liquid and solid effluents (including waste heat) from electric-generating facilities, and development, where appropriate, of control technology for the environmentally acceptable disposal of these effluents. The efforts conducted are designed to identify potential environmental effects and to define and reduce the costs of power plant waste disposal options.

Primary emphasis is focused on developing the data required to promulgate effluent guidelines required by the Federal Water Pollution Control Act and on providing the background information required to promulgate regulations required by the Resource Recovery and Conservation Act for the disposal of wastes generated by the utility industry.

- Advanced waste heat control **[H. B. Flora II - TVA]**
- Waste heat utilization **[B. J. Bond - TVA]**
- Evaluation of performance and economics of advanced cooling technology **[E. Plyler - EPA]**
- Utilization of waste heat and water from utility and industrial plants **[M. Maxwell, T. Brna - EPA]**
- Evaluation of potential and limitations of ocean disposal as a radioactive waste management alternative **[R. Dyer - EPA]**
- Hydrogeologic aspects of low-level radioactive waste disposal **[G. D. De Buchananne - USGS]**
- Management of Federal low-level waste **[G. H. Daly - DOE]**
- Beneficial use of reactor by-product isotope Cesium-137 for the disinfection of municipal sludge for recycle to agribusiness **[W. Remini - DOE]**
- Development of processes for disposal of flue gas cleaning wastes **[J. W. Jones - EPA]**
- Development of techniques for disposal or use of waste pollutants from combustion sources and associated control processes **[J. W. Jones - EPA]**

The objective of this program is the comprehensive assessment of the environmental, economic, and energy impacts of multimedia emissions of pollutants from stationary industrial, utility, residential, and commercial conventional combustion processes. Primary emphasis is on identifying and evaluating (1) the relationships between various emissions and residuals from conventional combustion, (2) multi-pollutant synergistic impacts, (3) cross-media impacts, (4) environmental impact tradeoff as relative emission levels of individual pollutants are adjusted by control systems, and (5) unregulated pollutant emissions, impacts, and control methods.

- Long-term implications of radioactive waste management **[J. Swift - EPA]**
- Assessment of environmental impact of shallow land burial of low-level radioactive waste **[L. Meyer - EPA]**
- R&D to support development of regulatory standards for low-level radioactive waste disposals **[J. Davis - NRC]**
- Advanced energy conversion environmental assessment and research **[A. Christianson, H. Bostian, W. Cain - EPA]**
- Indoor air quality assessment and control of pollutants **[W. Cain - EPA]**
- Assessment and development of air pollution control technology for waste-as-fuel processes **[R. Olexsey - EPA]**
- Assessment and development of water pollution control technology for waste-as-fuel processes **[R. Olexsey - EPA]**
- Assessment of existing processes for the separation of recoverable materials from solid waste **[R. Stenburg - EPA]**
- Assessment of existing processes for preparing refuse-derived fuels and feedstocks **[R. Stenburg - EPA]**
- Assessment of the co-incineration of sewage sludge with waste **[R. Stenburg - EPA]**

The general objectives of this program are to develop environmental assessments of energy conservation methods and advanced energy systems and to contribute to the development of pollution control technologies for resource recovery, energy-conserving industrial processes, advanced energy conversion cycles, and advanced energy systems—solar and geothermal energy. Techniques and technologies are under development by the Department of Energy, the Department of Housing and Urban Development, and other agencies in these areas, and by the EPA in the resource recovery area. Outputs will support two interagency working groups—the Interagency Task Force on Energy Conservation in Buildings and the Interagency Task Force on Energy Conservation in Industry, as well as EPA regulatory responsibilities assuring the environmental compatibility of techniques and technologies in each subject energy area.

- Pollution control problems and benefits of improved energy management [**R. Mournighan, C. C. Lee - EPA**]
- Characterization of multimedia pollutants resulting from using wastes as fuel [**H. Freeman - EPA**]
- Identification and characterization of industrial waste streams [**A. Christianson, G. Huffman - EPA**]
- Evaluation of major processes for co-firing waste with coal or other wastes [**R. Olexsey - EPA**]
- Development of processes for co-firing with oil [**R. Olexsey - EPA**]
- Evaluation processes for thermochemical conversion of waste [**W. Liberick - EPA**]
- Development of criteria for pollutants resulting from wastes-as-fuel processes [**R. Stenburg - EPA**]
- Waste stream surveys for non-industrial waste sources [**R. Stenburg - EPA**]
- Evaluation of major bioconversion waste-to-energy processes [**R. Stenburg - EPA**]
- Geothermal environmental impact assessment: surface and groundwater monitoring for contaminants [**D. Gilmore - EPA**]
- Geothermal energy resources and control technology assessment and research [**R. Hartley, A. Christianson - EPA**]
- Solar energy environmental assessment and research [**C. C. Lee, A. Christianson - EPA**]
- Resource observation [**P. Thome - NASA**]
- New techniques for improving mineral and energy resource exploration strategy [**B. B. Schardt - NASA**]

Flue Gas Sulfur Oxide Control

This program includes sulfur oxide pollution control research and development relating to electric utility and industrial power generation. Major efforts are directed towards flue gas desulfurization (FGD) technology development and assessment; assessment of the capital and operating costs of FGD systems; increasing FGD system reliability and reducing sulfur oxide emission levels with little or no cost impact, and transferring technological innovations to the public sector. Selected projects include:

- Development and demonstration of several processes for regenerable flue gas desulfurization **[R. Stern - EPA]**
- Enhancement of flue gas desulfurization technology transfer **[R. Stern - EPA]**
- Development and demonstration of non-regenerable flue gas desulfurization technology **[E. Plyer, M. Maxwell - EPA]**
- Marketing evaluation of by-products from flue gas desulfurization processes **[W. O'Brien - TVA]**
- Information, technology transfer, computer economics **[R. L. Torstrick - TVA]**
- Development of management techniques for the revegetation of SO_2 waste disposal products **[J. L. Crowe, J. C. Duggan - TVA]**
- Development of flue gas desulfurization technology—pilot plant studies of magnesium oxide scrubbing **[K. Schuppert, W. Wells - TVA]**
- Development of flue gas desulfurization technology—Shawnee lime/limestone scrubbing program **[G. A. Hollinden, J. L. Crowe, H. L. Faucett - TVA]**
- Energy requirement conservation study of selected processes for removing SO_2 from power plant gases **[G. G. McGlamery - TVA]**
- Development of comparative economics of SO_2 emission control processes **[G. G. McClamery - TVA]**

The purpose of this program is to develop the best practicable combustion technology for the control of NO_x emissions from the leading categories of stationary sources and diesel engines. Stationary source categories include utility boilers, commercial/industrial boilers, residential heating systems, stationary engines, and advanced combustion processes. Advanced combustion processes such as advanced coal burners and coal burner systems are being studied and fundamental engineering and analytical support studies are also being conducted to evaluate the potential of these advanced methods of NO_x emission control and energy conservation. The research on controlled combustion also includes fuel conditioning for sulfur oxide removal.

- Develop comparative economics of NO_x emission control processes [**T. Tarkington, J. D.Maxwell, T. A. Burnett - TVA**]
- Environmental impact assessment of NO_x flue gas treatment technology [**R. Stern - EPA**]
- Development and assessment of state-of-the-art technology for NO_x flue gas treatment [**R. Stern - EPA**]
- Development of criteria for extension of applicability of low-emission high-efficiency coal burners [**G. B. Martin - EPA**]
- Environmental assessment of stationary source NO_x control technologies [**J. S. Bowen - EPA**]
- Field testing - application of improved combustion technology to power generation combustion systems [**R. E. Hall - EPA**]
- Advanced combustion systems for stationary gas turbine engines [**W. S. Lanier - EPA**]
- Pilot scale evaluation of advanced combustion control techniques for fossil and waste fuels [**D. G. Lachapelle - EPA**]
- Effects of fuel properties and atomization parameters on NO_x control for heavy liquid fuel-fired package boilers [**W. S. Lanier - EPA**]
- Development of catalyst and system design criteria for catalytic combustors with application to stationary sources [**G. B. Martin - EPA**]
- Characterization of emission and combustion performance of alternate fuels [**G. B. Martin - EPA**]
- Characterization and design evaluation for commercial combustion systems [**R. E. Hall - EPA**]
- Bench-scale evaluation of simultaneous NO_x/SO_x flue gas treatment technology [**J. D. Mobley - EPA**]

- Bench-scale evaluation of NO_x flue gas treatment technology **[J. D. Mobley - EPA]**
- Long-term optimum performance/corrosion tests of combustion modification for utility boilers **[D. G. Lachapelle - EPA]**

Flue Gas Particulate Control

This program identifies and develops effective practicable technology to control aerosol emissions from manmade sources. Source categories addressed include industrial combustion and energy processs. Major research efforts in the program are assessment and extension of the capability of conventional systems (electrostatic precipitators, scrubbers, or fabric filters) for abating aerosol emissions, exploration of new and improved methods of control, and bench-scale investigation of specific control methods for major problem sources (low-sulfur coal combustion, new fuels, power production, and selected industrial processes).

- Development of control technology for removing fine particulates from waste gases [**J. Abbott - EPA**]
- Development of technology for high temperature/pressure particulate control for advanced energy systems [**D. Drehmel - EPA**]
- Effect of temperature, oxidation conditions - distribution of metals in various particle fractions of sludge and char [**H. Wall - EPA**]
- Fine particle control at high temperature and pressure [**D. C. Drehmel - EPA**]
- The use of electrostatically-charged fog for control of dust from open sources [**D. C. Drehmel - EPA**]
- Field testing - application of improved combustion technology to power generation combustion systems [**R. E. Hall - EPA**]
- Characterization and design evaluation for commercial combustion systems [**R. E. Hall - EPA**]
- Particulate sampling and support [**B. Harris - EPA**]
- Demonstration of baghouses for collection of fly ash from low-sulfur coal [**D. L. Harmon - EPA**]
- Demonstration of sodium conditioning of fly ash to reduce electrical resistivity [**L. E. Sparks - EPA**]
- Engineering evaluation of fine particle resistivity/high resistivity electrostatic precipitators [**L. E. Sparks - EPA**]
- Transport diagnosis of high resistivity fly ash in electrostatic precipitators by LASER Doppler instrumentation [**L. E. Sparks - EPA**]
- Investigation of the effect of electrostatic precipitators, scrubbers, and baghouses on in-stack opacity [**L. E. Sparks - EPA**]
- Effects of conditioning agents on emissions from coal-fired boilers [**L. E. Sparks - EPA**]

Other Sources of Energy/Environment R&D Information 32

This directory of additional information sources represents only some of the many agencies and organizations involved in energy/environment R&D. Those listed here are directly related to concerns addressed by the Interagency Program.

PROGRAM PLANNING AND DEVELOPMENT

- Environmental Protection Agency

Office of Research and Development	DR. STEPHEN J. GAGE
Office of Environmental Engineering and Technology	DR. STEVEN R. REZNEK
— Energy Processes Research	FRANK PRINCIOTTA
— Industrial and Extractive Processes	CARL SCHAFER
— Research Laboratories	
IERL/RTP	DR. JOHN K. BURCHARD
IERL/Cincinnati	DR. DAVID G. STEPHAN
MERL/Cincinnati	FRANCIS T. MAYO
Office of Environmental Processes and Effects Research	DR. ALAN HIRSCH
— Health and Environmental Effects	WILLIAM FRIETSCH, III
— Research Laboratories	
ESRL/RTP	DR. ALFRED H. ELLISON
ERL/Narrangansett	DR. TUDOR DAVIES
ERL/Gulf Breeze	DR. HENRY ENOS
ERL/Corvallis	DR. THOMAS A. MURPHY
ERL/Duluth	DR. J. DAVID YOUNT
ERL/Athens	DR. DAVID W. DUTTWEILER
RSKERL/Ada	WILLIAM C. GALEGAR

Other Sources

• Department of Energy:	
— Energy Technology	EMILIA L. GOVAN
— Energy Research	JOHN DEUTCH
— Resource Applications	ELLISON BURTON
— Program Coordination	GEORGE R. SHEPHERD
— Management Support	JOHN C. WHITNAH
— Environmental Compliance and Overview	ROBERT J. CATLIN
— Technology Impacts	PETER W. HOUSE
— Health and Environmental Research	W. W. BURR, JR
• Department of Commerce, National Oceanic and Atmospheric Administration:	
— Ocean energy, natural gas conservation and usage forecasting, and nuclear waste management	DR. RICHARD LEHMAN
— National weather modification monitoring and program monitoring of weather modification for NOAA	DR. RONALD L. LAVOIE
• U.S. Department of the Interior: Fish and Wildlife Service	
— Land and water resource development planning	TOM BOND
• National Bureau of Standards:	
— Reduced energy waste for energy use and conversion efficiency improvement	DR. JACK E. SNELL
• U.S. Department of Agriculture:	
— Conservation of energy, renewable or noncritical energy sources use; physical and socioeconomic consequences of alternatives for energy production availability and use	DR. KEITH R. SHEA, DR. LANDY B. ALTMAN

– Office of Energy	DR. WELDEN BARTON, HARRY E. BROWN
• National Aeronautics and Space Administration:	
– Application of space-environment characteristics to energy-related problems on earth	DONALD A. BEATTIE
• U.S. Department of Justice:	
– Legal actions relating to control and abatement of pollution sources, and wetlands preservation	ANGUS MACBETH
• U.S. Department of Transportation, Federal Aviation Administration:	
– Stratospheric and lower atmospheric pollution problems	JOHN E. WESLER, N. SUNDARARAMAN
– Aviation standards and regulations	ANTHONY J. BRODERICK
• National Science Foundation :	
– Problem focused research applications	DR. CHARLES C. THIEL, JR.
– Ecology, ecosystem studies, and systematics	DR. JOHN BROOKS
– Policy studies in environment, energy and resources	DR. FRANK HUBAND

RESEARCH INFORMATION SYSTEMS

• U.S. Environmental Protection Agency:	
– Interagency Technical Information Coordination	FRANCINE SAKIN JACOFF
– Office of Research and Development Technical Information Coordinator	RICHARD M. LASKA
– Office of Research and Development Information System (CRDIS)	ALBERT PINES
– Technology Transfer Program Environmental Protection Agency Project-level technical reports	ROBERT E. CROWE

Other Sources

- U.S. Department of Energy:
  - Inventory of Federal energy-related environment and safety research — SUSAN ROSE
  - Director, Office of Program Coordination — DR. GEORGE SHEPHERD
  - Office of Energy Information Services — JOHN DANIELS
    General inquiries on energy issues, provides answers or refers to appropriate Department of Energy Office
  - Office of Energy Research — DR. JAMES LEISS
- U.S. Department of Agriculture:
  Office of Energy Liaison for energy concerns
  - Program and policy coordination — WELDON BARTON
- National Oceanic and Atmospheric Administration:
  - National Environmental Satellite Service — JERRY C. GLOVER
  - Environmental Data Services — DR. THOMAS S. AUSTIN
- Oak Ridge National Laboratories Inventory of Energy R&D:
  - Project information — DR. GLORIA M. CATON
- Library of Congress:
  - Energy bibliographies — CONSTANCE CARTER
- Smithsonian Science Information Exchange: — SAMUEL LIEBMAN
  Project level energy information on Federally funded R&D

PUBLICATIONS SERVICES

- Environmental Protection Agency/Office of Research and Development:
  - Technical information publications — LINDA K. SMITH

Other Sources

- National Technical Information Service:
  - Clearing-house for Government funded reports
  - General energy — EDWARD LEHMANN
  - Solid waste — AUDREY HUNDEMANN
  - Energy — AUDREY HUNDEMANN
  - Air — DIANE CAVAGNARO
  - Water pollution — ROBENA BROWN

QUALITY ASSURANCE

- National Bureau of Standards:
  - Analytical chemistry standard reference methods for organic and inorganic pollutants, particulates, and gases — DR. PHILIP LaFLEUR
  - Radioactivity standards and measurement methods applied in neutral environmental matrices — DR. CHRIS KUYAPT
  - Atmospheric pollution measurements and standard reference materials — DR. W. ZIELINSKI, JR.
  - Trace analysis for identification of pollutants in water; development of standard reference materials for instrument calibration of water pollution measurements; characterization of flow properties for sample collection — DR. L. McCLENDON

ENERGY EFFICIENCY

- National Aeronautics and Space Administration: Application of space experience to energy-related problems on earth
  - Advanced aerodynamics and active controls systems development for energy-efficient transport — KENNETH E. HODGE
  - Advanced propulsion systems development — FREDERICK P. POVINELLI
  - Development of composite structures for weight savings to fuel economy — DR. MICHAEL SALKIND

Other Sources

- Department of Commerce:
  - Energy-conserving pollution standards for manufacturing and electric generating industries — ROBERT GRANT
- Department of Transportation:
  - Accessible transportation environment for the handicapped and elderly; Historic preservation; Air Quality/Transportation planning interface; Transportation and the urban environment — MARTIN CONVISSER
- DOT/National Highway Traffic Safety Administration:
  - National Energy Efficient Driving System: Train and inform drivers to conserve fuel — JOHN EBERHARD
  - Voluntary truck and bus fuel economy improvement program — W. HARRY CLOSE
  - Research and analysis of automotive fuel economy — SAMUEL F. POWEL, III
  - Automotive fuel economy standards development — DR. RICHARD STROMBOTNE
  - Periodic Motor Vehicle Inspection Program: Impact of currently used vehicles on the environment — JOSEPH P. GRILLO
  - Vehicle in-use inspection standards — JOSEPH INNES

ENERGY SUPPLY AND DEMAND FORECASTS

- Department of Commerce:
  - Supply and demand forecasts by states, by fuels, for the rest of the century — JOSEPH F. GUSTAFERRO

OIL SPILLS

- U.S. Coast Guard:
  - Environmental Technology Branch: Containment and cleanup of oil spills — CDR TED LEIGH

— Chemistry Branch: Oil fingerprinting-analyzing oil samples to determine source composition	DR. G. KLEINEBERG
— Planning and Special Projects: Research on oil spill prevention technologies and techniques	CDR J. H. PARENT
— Oil spill statistics	DR. CHARLES C. BATES
— Marine Environmental Protection Division: Federal response to oil spills	CAPT JOHN R. KIRKLAND

HEALTH AND URBAN ENVIRONMENT

• Environmental Protection Agency:	
— Health and ecological effects research	DR. WILLIAM MURRAY
• U.S. Department of Housing and Urban Development:	
— Lead exposure in the urban environment and general urban environmental research	IRWIN BILLICK
— Noise, air pollution, and general environmental quality in the urban environment	GEORGE WINZER
— Housing and community-development-related problems in environmental and energy areas	GEORGE KARAS
• National Institute of Occupational Safety and Health:	
— Occupational safety and health questions related to energy production and use	JACK HARDESTY
• Electric Power Research Institute:	
— Impact of electrical supply systems on health and environment	DR. RALPH PERHAC
— Health effects	DR. JAMES McCARROLL

Other Sources

— Biomedical studies	DR. LEONARD SAGAN
• Bituminous Coal Research, Inc.:	
— Assessments of health and environmental effects from coal mining and coal utilization	JAMES GARVEY JAMES BOYER EARLE DIEHL
• American Petroleum Institute: Environmental Hygiene	
— Biomedical Studies	DR. NEILL WEAVER
— Non-health-related studies: Air and water quality; Mobile and stationary sources; Solid waste; Fate and effect of oil spills	DR. GEORGE PATTON
• National Cancer Institute:	DR. H. F. KRAYBILL
— NCI/EPA collaborative program—environmental cancer; air, water, energy technologies	DR. H. F. KRAYBILL, DR. J. I. MUNN
— NCI/NIOSH collaborative projects—occupational exposures to carcinogens	DR. T. P. CAMERON
— Bioassays for carcinogenesis	DR. RICHARD GRIESEMER
— Cancer cause and prevention	DR. H. F. KRAYBILL
— Policy	DR. GREGORY T. O'CONOR
— NCI Clearinghouse	DR. JAMES SONTAG

ALTERNATIVE ENERGY SOURCES

• National Aeronautics and Space Administration:	
— Wind power storage	RALPH LaROCK
— Photovoltaics	JOHN LORIA
— Solar and thermal electricity	ROBERT WASEL

Other Sources

- Department of Energy:
  - Conservation and solar applications — DR. MAXINE SAVITZ

REGIONAL PROGRAMS

- Department of Energy:
  - Information on and coordination of all energy/power projects in western area — ROBERT L. McPHAIL
- Western Interstate Energy Board:
  - Information and research on all phases of energy for sixteen western states — JOHN L. WATSON
- Old West Regional Commission:
  Environmental and socioeconomic impact on communities involved in coal development
  - Technical information publications — GEORGE D. McCARTHY
- Four Corners Regional Commission:
  - Water conservation, environmental impact, alternative energy sources, and socioeconomic impacts — NORRIS C. ELLERTSON
- Economic development programs and funding of projects related to energy conservation and environmental protection:
  - Upper Great Lakes Regional Commission — WILLIAM R. BECHTEL
  - Ozarks Regional Commission — JOHN SCOTT
  - Southwest Border Regional Commission — ROBERT G. TOBERMAN
  - Pacific Northwest Regional Commission — ARTHUR JOHNSON
  - Appalachian Regional Commission — SALIM KUBLAWI
- New England Regional Commission:
  - Energy policy analysis, regional energy data base, financial support to regional energy offices; outer continental shelf pipeline corridors, alternative/renewable energy resources — W. ROBERT KEATING

• Coastal Plains Regional Commission:	
— Evaluation and analysis of water resources for the coastal plains region, and exchange of information on treatment and disposal for regional economic development	DR. CLAUD ANDERSON, McIVER WATSON

INTERNATIONAL PROGRAMS

• United Nations Environment Program:	
— Liaison for inquiries and information	DR. NOEL J. BROWN
• Organization for Economic Cooperation and Development	DR. MILTON KLEIN
• U.S. Department of State:	
— Office of Environmental Affairs: Liaison for international and domestic energy/environment R&D	DR. DONALD R. KING
— Office of Oceans and International Environmental and Scientific Affairs:	
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INDUSTRIAL PLANNING AND REGULATION

• U.S. Department of Commerce:	
— Industrial regulatory analysis	DR. EDWIN B. SHYKIND
— Advise the Secretary of Commerce on energy matters	ORCUTT P. DRURY
• U.S. Department of Interior:	
— Mining regulatory functions and energy/environmental research	MICHELE ZARUBICA
— Review and preparation of Environmental Impact Statements	LEONARD SHAW

Other Sources

— Surface mining regulations and information	MONA SMITH
• Federal Energy Regulatory Commission:	
— Environmental studies for natural gas and oil pipeline certification; program review for rates	BARRY HAASE
— Regulatory Policy Analysis	DR. HASKELL P. WALD
— Licensing hydro-electric plants	DR. WILLIAM LINDSAY
• Electric Power Research Institute:	
— Air quality control for coal combustion systems	DONALD TEIXEIRA
— Water quality control, heat rejection, and solid waste disposal for coal combustion systems	JOHN S. MAULBETSCH
— Identification, characterization, monitoring; transport and interactions; alternative land and water use; advanced technologies for fossil-fueled power plants	DR. RALPH PERHAC
— Ecological effects of energy technologies	DR. ROBERT W. BROCKSEN
— Coal combustion systems: air and water quality control, coal cleaning, fluidized combustion	KURT YEAGER
— Integrated assessment	DR. RONALD WYZGA
— Desulfurization processes	DR. GEORGE PRESTON
— Energy analysis and environment	DR. MICHAEL TINKLEMAN
• Gas Research Institute:	SAM BOORAS
— Liquid Natural Gas Safety	
— Operations/distribution	
— Environment	

Other Sources

- National Coal Association:
  - Air and water quality monitoring and assessment of effects of coal mining and use — JOSEPH MULLAN, CHARLES DREVNA
  - Identification of R&D needs and priorities for coal mining operations, occupational health and safety and environmental effects — DR. JOSEPH YANCIK

DEPARTMENT OF DEFENSE

Energy/environment research, development, and demonstration for DOD-related areas and concerns.

- Energy Programs and Policy:
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    - Director, Energy Program — WILLIAM J. SHARKEY, JR.
      - Technology Application — WALTER C. CHRISTENSEN
      - Petroleum — WILLIAM J. HORTON
      - Information and Program Management — WILLIAM F. VANCE
      - Conservation — COL JOHN E. WAGNER
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    - Director of Research — DR. G. GAMOTA
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- Navy-Special Assistant for Energy — DR. THEODORE JACOBS
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- Defense Fuel Supply Center:

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— Chief, Environmental Control Office	CALVIN J. MARTIN
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— Pesticides, Toxic and Hazardous	GEORGE W. SIEBERT
— Radioactive Wastes	CPT JERRY CLIFFORD
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— Special Assistant for Environmental Protection	JOSEPH W. URBANEK

WHITE HOUSE OFFICES

• Council on Environmental Quality: Energy Programs	DR. JAMES MACKENZIE GERALD L. BRUBAKER JOHN DAVIDSON

- Office of Management and Budget:
  - Review of Federal energy/environment research budgets — JIM J. TOZZI, HUGH LOWETH
  - Management and Government Reorganization — WILLIAM W. HARSCH

SENATE COMMITTEES

- Agriculture, Nutrition, and Forestry
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    - Senator ERNEST F. HOLLINGS, Vice Chairman

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	RICHARD D. GRUNDY Senior Professional Staff Member - Energy
	MICHAEL HARVEY Chief Counsel
– Subcommittee on Energy Regulation Senator J. BENNETT JOHNSTON, Chairman	DR. BENJAMIN COOPER Professional Staff Member
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Other Sources

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• Interstate and Foreign Commerce Congressman HARLEY STAGGERS, Chairman	W. E. WILLIAMSON Staff Director & Chief Clerk
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– Subcommittee on Fisheries and Wildlife Conservation and the Environment Congressman JOHN BREAUX, Chairman	NED EVERETT, R. D. THORNTON Counsels
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– Subcommittee on Natural Resources and Environment Congressman JEROME A. AMBRO, Chairman	IAN MARCEAU Staff Director
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- Subcommittee on Energy Research and Production
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- Subcommittee on Energy Development and Applications
  Congressman RICHARD OTTINGER, Chairman

  JAMES W. SPENSLEY
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- Small Business
  Congressman NEIL SMITH, Chairman

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- Subcommittee on Energy, Environment Safety and Research
  Congressman THOMAS A. LUKEN, Chairman

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Interagency Program Directory and Index

The following abbreviations are used in this index:

CEQ — Council on Environmental Quality
DOE — ECT — Environmental Control Technology
LASL — Los Alamos Scientific Laboratory
LETC — Laramie Energy Technology Center
OHER — Office of Health and Environmental Research
DOT — Department of Transportation
FAA — Federal Aviation Administration
NHTSA — National Highway Traffic Safety Administration
EPA — CERI — Center for Environmental Research Information
EMSL — Environmental Monitoring and Support Laboratory
ERL — Environmental Research Laboratory
ESRL — Environmental Sciences Research Laboratory
HERL — Health Effects Research Laboratory
IERL — Industrial Environmental Research Laboratory
MERL — Municipal Environmental Research Laboratory
OEET — Office of Environmental Engineering and Technology
OEPER — Office of Environmental Processes and Effects Research
OHR — Office of Health Research
OMTS — Office of Monitoring and Technical Support
ORD — Office of Research and Development
ORP — Office of Radiation Programs
ORPM — Office of Research Program Management
QAD — Quality Assurance Division
TIO — Technical Information Office
HEW — NCI — National Cancer Institute
NIH — National Institutes of Health
OECSP — Office of Extramural Coordination and Special Projects
NASA — ERL — Earth Resources Laboratory
NOAA — EDIS — Environmental Data and Information Service
ERL — Environmental Research Laboratories
NODC — National Oceanographic Data Center
NWS — National Weather Service
TDL — Techniques Development Laboratory
TEL — Test and Evaluation Laboratory
WPL — Wave Propogation Laboratory
NTIS — National Technical Information Service
ORBES — Ohio River Basin Energy Study
TVA — OACD — Office of Agricultural and Chemical Development
USDI — OSM — Office of Surface Mining

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